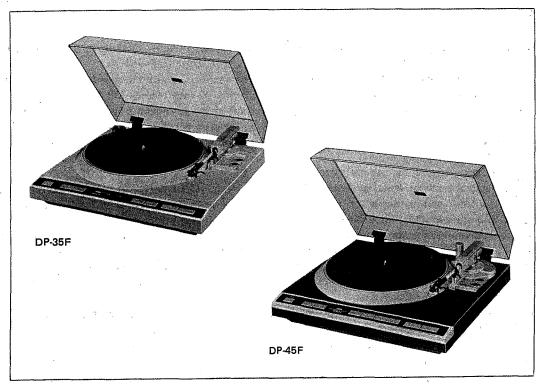
DENON

SERVICE MANUAL

FULLY AUTOMATIC DIRECT DRIVE TURNTABLE SYSTEM

MODEL DP-35F/45F SERIES

U.S. and Canadian models do not include cartridge.



NIPPON COLUMBIA CO., LTD.

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FEATURES

1. Microprocessor controlled, contactless servo tonearm

A unique microprocessor controlled, contactless servo tonearm ensures safe, easy to use automatic operation with no deterioration in sound quality.

2. Q-damping method (Dynamic servo tracer)

Low frequency resonance caused by the cartridge compliance and the effective tonearm mass is electronically damped both horizontally and vertically to effectively suppress crosstalk and inter-modulation distortion. The dynamic servo tracer maximizes the performance of the law mass tonearm and results in a record reproduction of excellent sound image with minimum noise and distortion.

3. Low mass straight arm

Having an outstanding tracing ability, this arm maximizes the performance of the high compliance cartridge to the full extent. Even with the most up-to-date high grade records, its tracing ability is excellent.

4. Location function (DP-45F)

Just by pressing the locate button, the tonearm is moved to any desired location where the record play is started.

5. Record size detector and automatic speed selector (DP-45F)

The record size and the speed are automatically set, when playing 12 inch records (33 1/3 rpm) or 7 inch records (45 rpm) in the automatic play mode. The unit provides a safety measure which causes the tonearm to stop and return to the arm rest to protect the stylus tip when there is no record on the turntable, even if the start button is pressed.

6. DENON quartz on bi-directional servo

The ultimate in rotational accuracy is realized by the combination of a magnetic pulse detector and a quartz lock, with the addition of a bi-directional servo. On the DP-45F, with the utilization of the bi-directional servo and a quick response electronic brake, an even steadier rotational performance has been achieved.

7. Newly developed cartridge

The low mass MM type cartridge DL-60 with an elliptically shaped stylus minimizes tracing distortion and contributes to the clarity of the reproduced sound.

NOTE:

U.S. & Canadian models do not include cartridge.

SPECIFICATIONS

Phono motor section

Servo controlled direct drive Drive system:

33-1/3, 45 rpm Turntable speeds:

Below 0.012% wrms (servo system) Wow & flutter:

Below 0.02% wrms (JIS)

Over 78 dB (DIN-B) S/N ratio:

Normal speed within 2 seconds (at 33-1/3 rpm) Rise time:

Aluminum die-cast; 300 mm diameter Turntable platter:

Linear drive motor Motor:

Speed servo by frequency detection and phase servo control Speed control system:

Below 0.002% Speed deviation:

0% (80 g stylus force; outermost groove) Load characteristics:

Tonearm section

Dynamically balanced, straight tube tonearm Arm type :

220 mm Effective length: 16 mm Overhang: Within 3° Tracking error:

Electronically controlled, fully automatic Automatic mechanism:

 $0 \sim 3.0 \text{ g} (1 \text{ scale}=0.1 \text{ g})$ Adjustable stylus force range:

Approximately 4.0 ~ 9.0 g (including screws, nuts) Suitable cartridge weight range:

• Cartridge section :

DL-60 Moving magnet (MM) Type:

2.5 mV Output voltage: 20 Hz ~ 30 kHz Frequency response:

 $1.8 \pm 0.3 g$ Tracking force:

General

50/60 Hz, Voltage is shown on rating label Power supply:

Approx. 8W Power consumption: 434 (W) x 135 (H) x 412 (D) mm Dimensions :

17 (W) \times 5.3 (H) \times 16.2 (D) in

Approx. 7 kg

Weight: Approx. 15 lb.

• U.S. and Canadian models do not include cartridge. Above specifications and outward appearance may be altered in future for improvement.

WARNING:

1. Component parts

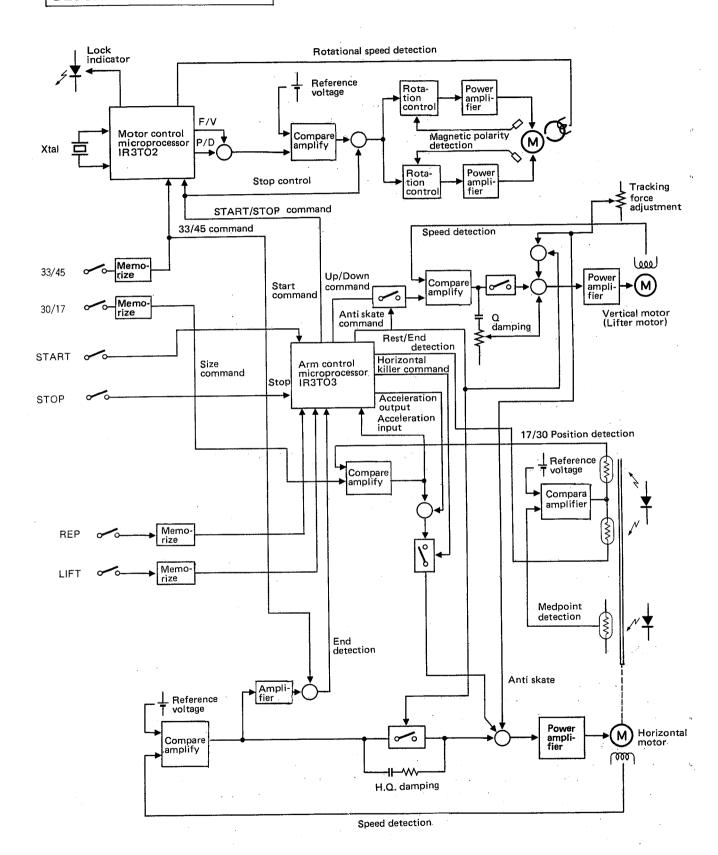
Parts marked with 🛕 and/or shading in this service manual have special characteristics important to safety. Be sure to use the specified parts for replacement.

2. Leakage current

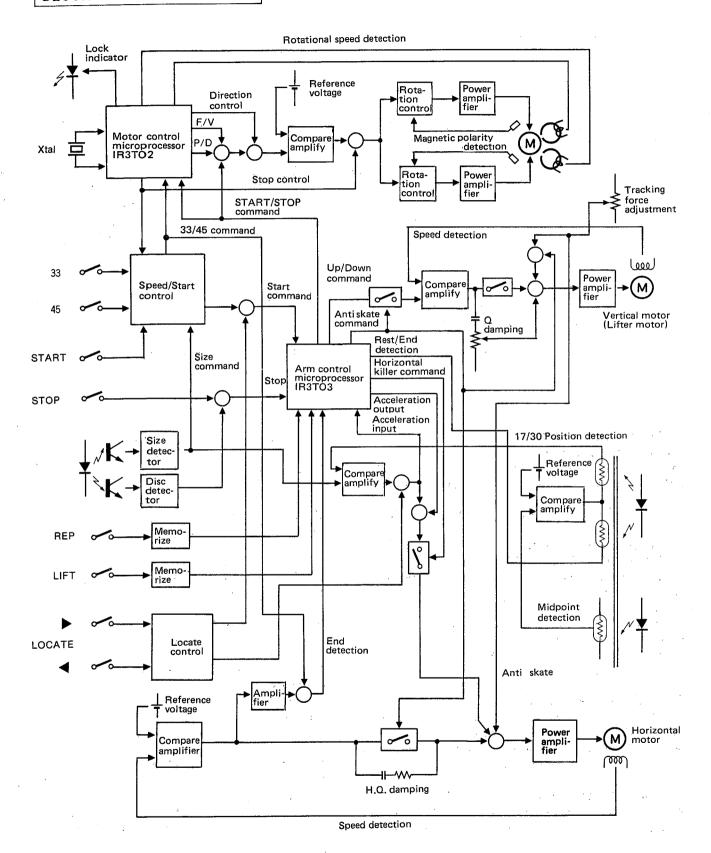
Before returning the appliance to customer, test the leakage current when the power plug is connected. Use a calibrated (with an error of not more than 5%) leakage current tester and measure the leakage current from any exposed metal to the earth ground. Reverse the power plug polarity and test the above again.

Any current measured MUST NOT EXCEED 0.5 milliamps. Corrective measure must be taken if it exceeds the limit.

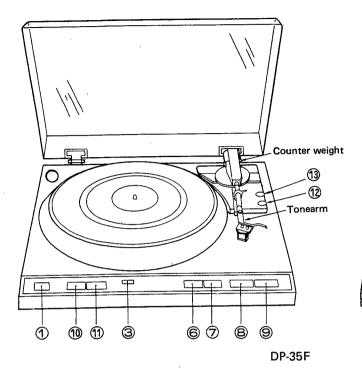
BLOCK DIAGRAM OF DP-35F

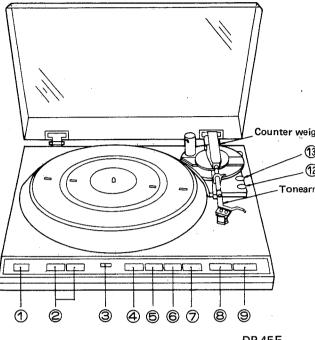


BLOCK DIAGRAM OF DP-45F



PART NAMES AND FUNCTION





DP-45F

1. Power switch POWER

This turns the power supply on and off. Push the button down until it locks. When power is turned on, the (LOCK) indicator will light up. When turning the power off, press the button until the lock is disengaged. Be sure to return the tonearm to the arm rest and hold it in with the clamp.

2. Speed selector button 33. START. 45 (DP-45F)

For playing records manually, press the button corresponding to the record speed.

33 1/3 rpm records (33. Start) 45 rpm records (45. Start)

In the automatic play mode, the switch will automatically be set to "33" for 12 inch records and "45" for 7 inch records.

3. Lock indicator LOCK

The (LOCK) indicator will light up when the power is turned on. After starting play, the lamp will flicker until the proper turntable speed is reached. Once the proper speed has been attained, the lamp will stay lit.

Press this button to move the tonearm to the left, towards the record center, to start the record at any desired location.

► LOCATE (DP-45F) 5. Locate button

Press this button to move the tonearm to the right, away from the record center, to start the record at any desired location.

6. Arm lifter button UP LIFTER

Press this button to raise or lower the tonearm during play, or when playing records manually. The "UP" indicator will light up.

7. Repeat button REPEAT

Press this button for playing the same record repeatedly: the "ON" indicator will light up.

8. Start button START

Press this button to start records automatically.

9. Stop button STOP

Press this button to stop a record during play.

10. Size button SIZE (DP-35F)

Before playing a record, press the button corresponding to its record size.

For 30 cm (12 inch) records, the (30) indicator will light. For 17 cm (7 inch) records, the (17) indicator will light.

11. Speed button (DP-35 SPEED)

Before playing a record, press the button corresponding to its record speed.

The (33) indicator will light for 33 1/3 rpm records.

The (45) indicator will light for 45 rpm records.

12. Stylus force adjustment knob STYLUS FORCE

This is used to adjust the stylus force.

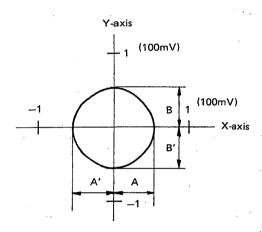
13. Q-damping adjustment knob Q-DAMPING

ADJUSTMENT METHOD

PHONO MOTOR ADJUSTMENT

1. Off-set adjustment

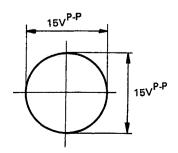
- Set the X-axis and Y-axis sensitivity of the oscilloscope to 100mV/cm by using a 10:1 probe.
- 2) Connect the X-axis terminal of the probe with TP-203 on the motor drive base board and the Y-axis terminal of the probe with TP-204. Use pin No. 8 as the ground.
- 3) Connect pin No. 5 and pin No. 8 and make a low resistance circuit on the input terminal.
- 4) Stop the rotor at the maximum position of the X-axis amplitude of the Lissajous' figure of the oscilloscope while turning the motor by hand.
- 5) Set the maximum amplitude at the X-axis by adjusting VR-201. A = A'
- 6) Stop the rotor at the maximum position of the Y-axis amplitude of the Lissajous' figure.
- Set the maximum amplitude at the Y-axis by adjusting VR-202.
 B = B'
- 8) Adjust the center of the circle to \pm 50mV.



9) Disconnect pin No. 5 and pin No. 8 after adjutment.

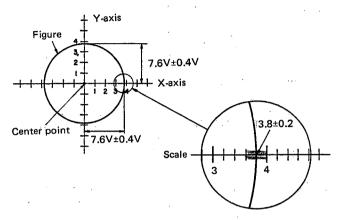
2. Amplitude adjustment

- 1) Check the X-axis and Y-axis sensitivity of the oscilloscope by using ± 5V power supply.
- In case of DP-45F, cover the photo transistor of the size detecting light receiver with a black rubber sheet or something to avoid that light enters.
- 3) Remove the arm from the arm rest and remove the turntable. Then, turn the motor with full speed.
- 4) Set the amplitude of the X-axis and Y-axis of the Lissajous' figure to 15 VP-P by adjusting VR-203 and VR-204. Make sure that there is no voltage difference between the X-axis and the Y-axis.



3. Center adjustment

- Adjust the X-axis and Y-axis sensitivity of the oscilloscope to 2V/cm.
- 2) Set the amplitude of the X-axis and Y-axis of the Lissajous' figure to exactly the same point from the center by adjusting VR-205 and VR-206. After the adjustment, the amplitude should be as shown in the figure below.



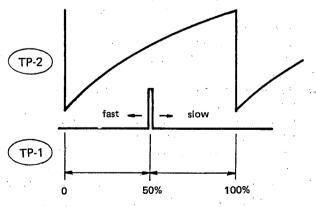
4. Adjusting the head gap

Adjust, so that the gap between the turntable magnetic coating surface and the detection head is 0.18 mm.

5. Lock adjustments for 45 rpm

Hereafter, the earth reference point of the measuring instrument should be connected to wrapping terminal 35 of the servo control circuit board.

- Connect the two-channel oscilloscope to TP-1 and TP-2.
- 2) Set the speed selector to 45 rpm.
- Take the arm off the arm rest and move it toward the turntable to rotate the phonomotor.
- 4) Adjust VR-1 so that the pulse from TP-1 is positioned to 50% of the triangular wave length from T.P. 2.



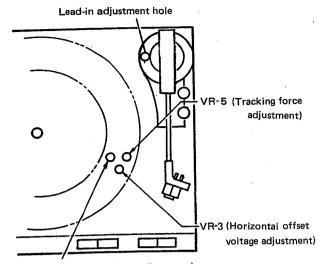
6. Lock adjustments for 33 rpm

- Connect the oscilloscope in the same manner as the 45 rpm lock adjustments. Set the speed selector to 33 rpm.
- 2) Make sure that the sampling pulse is positioned between 40% and 80% of the triangular wave length.

NOTE:

Phase lock position for 33 rpm is fixed (relative to 45 rpm) by R12 (metal film resistor).

ADJUSTING THE ARM CONTROL SECTION



VR-4 (Lifter offset voltage adjustment)

1. Adjusting the horizontal OP amp. offset voltage

- Fix the tonearm to the arm rest and connect the oscilloscope to TP-8.
- 2) Set the lifter switch to the UP condition.
- 3) Turn VR-3 and adjust to 0V±0.01V.

2. Adjusting the lifter OP amp. offset voltage

- 1) Fix the tonearm to the arm rest and connect the oscilloscope to TP-6.
- 2) Set the lifter switch to the DOWN condition.
- After about 7 seconds, adjust to 0V±0.01V by turning VR-4.

3. Adjusting the tracking force

- 1) Turn the power supply switch OFF.
- Take the arm off the arm rest. Rotate the balance weight so that the tonearm becomes parallel to the turntable surface when let go.
- 3) Return the arm to the arm rest and turn the power supply switch ON.
 - (Note) In case of DP-45F, cover the size detecting photo transistors (2 pieces) with a rubber sheet or something to avoid that light enters.
- 4) Wait seven seconds after the arm has lowered. Place the cartridge stylus tip onto a stylus force gauge and set the stylus force adjustment knob to 1.5 g.
 - (Note) At this time, the stylus tip height should be adjusted so that it is about the same height as during play.
- 5) Turn VR-5 and adjust, so that the stylus force gauge reads 1.5 g. (Turn VR slowly.)

Adjusting the 30 cm lead-in position

1) Place a 30 cm record on the turntable and set the record size selector switch to "30".

(Note) Keep the bottom cover closed.

2) Move the arm so that the stylus tip is at approximately the 30 cm lead-in position. Insert a small flat-headed screwdriver into the lead-in adjustment hole; move the arm back and forth and fit the screw driver into the groove of the cam inside gently. 3) After turning the screwdriver, pull it out once. Press the start switch and adjust so that the stylus position stops at the 30 cm lead-in position.

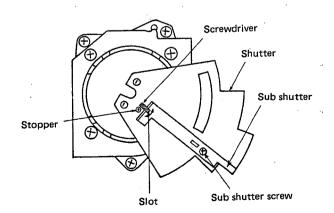
(Note) The 30 cm lead-in adjustments cannot be performed unless the stylus tip position is approximately in the 30 cm lead-in position. In addition, if the screwdriver is left inserted, the arm will not move.

5. Adjusting the 17 cm lead-in position

Adjust as necessary, such as when parts of the sensor section have been replaced.

However, the following procedures should only be used when a discrepancy is found for the 17 cm lead-in position, after the 30 cm lead-in position has been adjusted.

- Set the record size selector to 17 cm.
 (Note) In case of DP-45F, the size is automatically changed by placing a 17 cm record on the turntable.
- 2) By continuously pressing the start switch, the arm will move over and stop. At this time, check now many millimeters, toward the inside or outside, the stylus tip deviates from the required 17 cm lead-in position.
- 3) Take off the bottom cover of the cabinet and check the adjustment scale position of the shutter. (One adjustment scale corresponds to a stylus tip movement of 0.5 mm.)
- 4) Untighten the screw holding the sub shutter and place a small flat-headed screwdriver into the slot of the shutter. When the stylus position is toward the inside, compared to the required position, move the sub shutter toward the right of the scale; when the stylus position is toward the outside, move the sub shutter toward the left. When completed, tentatively tighten the screw holding the sub shutter.
- After the adjustments are made, press the start switch and check whether or not the stylus stops at the 17 cm lead-in position.
- If the stylus stops at the required position, then tighten the sub shutter screw.



PARTS LIST OF EXPLODED VIEW

Ref. Part No. Part Name Remarks									
4713003018 348 CPS 4713003000 20 CULER 471 KU502177 25 SERVO CONTROL UNIT DP45F 248 SERVO CONTROL UNIT DP45F 25 SERVO CONTROL UNIT		Part No.	Part Name	Remarks			Part No.	Part Name	Remarks
2 4711303018 3 MS CPS 34 4735030005 3W 4 43354201 COLLER 4 43354201 COLLER 5 433522004 SPRANG 5 341002005 SPAY CONTROL UNIT DP 245F 6 433522004 SPRANG 6 471181012 2x3 CPS 6 471810300 SPAY CPS 7 473600000 SPAY CPS 1 3381640100 SPAY CPS 1 338164010 SPAY CPS 1 3381640100 SPAY CPS 1 338160100 SPAY CPS 1 338164	-	4713303045	3x6 CBS		İ	45	4638631203	SPRING	
2 4751093006 3W COLLER	1	· · · · · · · · · · · · · · · · · · ·	·	·			KU-5021	SERVO CONTROL UNIT	DP-35F
4 439345201 COLLER SPINIG SPI	I		,				KU-5020	SERVO CONTROL UNIT	DP-45F
6 47118070 2x3 CPS		1				47	KU-5021*7	POWER SW P.C.B.	DP-35F
6		! 1					KU-5020*7	POWER SW P.C.B.	DP-45F
7 A398241100 SHUTTER S A49103009 A791003009 A7910030001 A791003001 A7910030001 A791003001 A7910003001 A791003001 A791003001 A791003001 A791003001 A7910003001 A	1	1				48	KU-5021*8	LOCK LED P.C.B.	DP-35F
8		1	·				KU-5020*8	LOCK LED P.C.B.	DP-45F
9 4751003000 BE RING 10 4751005004 4W 13168401003 AV2 (STS 12) 12 4248019020 AV2 13 473081012 AV2 (STS 12) 14 238801212 COIL ASSY 15 47338105103 AV3 (ASSY) 16 318712108 LATERAL WEIGHT 17 4744304000 AV3 (AV3 AV3 AV3 AV3 AV3 AV3 AV3 AV3 AV3 AV3	1		=	Ì		49	1138161302	BUTTON (A)	
10			* *	,		50	1138162110	BUTTON (B)	DP-35F
11 1 3158451003 FRICTION WASHER 428019022 ADJUST CAM 473918091102 3x12 CBTS (2) DP-45F 4739309017 3x12 CBTS (2) DP-45F 428019020 3x12 CBTS (2) DP-45F 428019020 3x12 CBTS (2) DP-45F 428019020 3x12 CBTS (2) DP-45F 42801902 3x12 CBTS (1) DP-45F 42801902 3x12 CBTS (2) DP-45F 428019003 3x12 CBTS (2) DP-45F 4280	}	'''	*	,			1138162107	BUTTON (B)	DP-45F
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14 238901215 OOLL ASSY 15 4338175108		1	3×12 CBTS (1)	DP-45F		1	1298010005	CUSHION RUBBER	DP-45F
15 338175108 YOKE (A) ASSY 3186712108 A338175108 3412 CBRTS (1) 4420300000 3x3 BSS (0) 3x12 CBRTS (1) 54 3239046212 FOWER TRANS EQ. 2339046212 FOWER TRANS EQ.	14	1			\triangle	53	2339045213	POWER TRANS	E2,EA,EG,
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17				İ		7	2339049112	POWER TRANS	EC
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19			3x12 CBRTS (1)				2334072210	POWER TRANS	EU.
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1128085029	1	1128085003	VOLUME KNOB	DP-35F					EA,EG,EK
22 3158896002 TONE ARM ASSY BALANCE WEIGHT ASSYY BEACHT AND ASSYY DL-0600 TOLER AND ASSYY PICK UP CARTRIDGE E2,EP,E1, EA,EG,EK E4,13808003 3x25 CBS S3x12 CPTS (1) DP-35F A731806003 3x20 CPTS (1) DP-35F A731806003 3x20 CPTS (1) DP-35F A731806003 3x20 CPTS (1) DP-35F A731806003 3x20 CPTS (1) DP-35F A731806003 AND AND AND AND AND AND AND AND AND AND		1128085029	VOLUME KNOB	DP-45F		1	1038232111	CABINET	EP.E1
22 315899005 BALANCE WEIGHT ASS'Y BALANCE WEIGHT ASS'Y 1910L-0060 DL-0067 PICK UP CARTRIDGE PICK UP CARTRIDGE E2,EP_E1, EA,EG_EK PICK UP CARTRIDGE PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK PICK UP CARTRIDGE E4,EG_EK E4,731806003 3x20 CPTs (1) DP-35F DP-45F DP-	21	4756133007	14N			1	1018376314	CABINET ASS'Y	DP-45F
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25 DI-0060 PICK UP CARTRIDGE E2,EP.E1, EA,EG.EK 26 4713808003 3x25 CBS 27 4731808007 4731808007 3x20 CPTS (1) DP-35F DP			ASS'Y			57	1038233107	SUB PANEL	DP-35F
25 DL-0060 PICK UP CARTRIDGE E2,EP,E1, EA,EG,EK 26 4713808003 3x25 CBS 27 4731808001 3x25 CBS 28 2178081030 3x20 CPTS (1) DP-45F 28 2178081030 MOTOR ASS'Y DP-35F DV-45F 30 KU-5021*3 KU-5020*1 LEAD IN LED P.C.B. DP-45F 31 4730355018 3x10 CBRTS DP-45F 32 4418846014 WASHER 33 44188423006 MAGNETIC HEAD ASS'Y DP-45F 36 KU-5020*3 3x10 CBRTS DP-45F 37 470009019 3x6 CPS.W P.C.B. SUPPORT FRAME E1, FAME	24	3158553024	HEAD SHELL ASS'Y				1038230401	SUB PANEL	DP-45F
26 4713808003 3x25 CBS 27 4731808003 3x25 CBS 27 4731808003 3x20 CPTS (1) DP-45F	1	DL-0060	PICK UP CARTRIDGE	E2,EP,E1,		-58	1468151008	DUST COVER ASS'Y	
27 4731808001 3x12 CPTS (2) DP-35F DP-45F D	-	,		EA,EG,EK		59	4628023009	BUSHING	\$
27 4731808001 3x12 CPTS (2) DP.35F	26	4713808003	3x25 CBS			60	4018041015	HINGE	
28 2178081020 3x20 CPTS (1) DP-45F DP-35F D	1	4731808001	3x12 CPTS (2)	DP-35F		61	MD-3802	BUSHING	
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2178081027 NOTOR ASS'Y DP-45F	28	2178081030	MOTOR ASS'Y	DP-35F	1	62	2062002031	AC CORD	E2,EG
NU-SO20*1 OUTPUT P.C.B. DP-45F DP-35F CORD EA		2178081027	MOTOR ASS'Y	DP-45F			2062019008	AC CORD	EC,EU
KU-5020*1	29	KU-5021*1	OUTPUT P.C.B.	DP-35F			2006031026	AC CORD	E1
KU-5020*3				DP-45F			2062024006	AC CORD	EK
14730355018 3x10 CBRTS DP-35F DP-45F CFT S	30	KU-5021*3	LEAD IN LED P.C.B.	DP-35F			2006019307	AS 3P AC CORD	EA
4730305013 3x10 CBRTS (1) DP-45F CF CF CF CF CF CF CF		KU-5020*3	LEAD IN LED P.C.B.	DP-45F		63	EP-7376	CORD BUSH	DP-45F
4418846014 WASHER 4418846014 WASHER 4418846014 HEAD SUPPORT 34 4318423006 MAGNETIC HEAD 3918423006 MAGNETIC HEAD ASS'Y 36 KU-50206 P.C.B. SUPPORT 1468150517 FRAME 1468150517 FRAME 1468150517 FRAME 1468150517 FRAME 1421823006 REC. TURNTABLE 4218358003 REC. TURNTABLE 4218361003 RUBBER SHEET 4218361003 RUBBER SHEET 4218361003 RUBBER SHEET 4218361003 BOTTOM COVER 43 4751106042 WASHER 44 1048079102 INSULATOR ASS'Y 65 4338243001 SUB SHUTTER 66 4730460013 4×20 CBRTS (2) DP-35F 67 KU-5020*4 SIZE DET. P.C.B. 38 4730356017 3x12 CBRTS (2) 69 4318086000 FRICTION SHEET 70 KU-5020*5 SIZE DET. P.C.B 3158911103 ARM REST ASS'Y EC, EK, EG 72 4418314009 BUSH PLATE 73 4498066209 LED STAND 74 3939220000 LED WITH WIRE 75 1468153103 LED COVER 76 4733812008 3x12 CBTS (1) 77 2123315023 VOLTAGE SELECTOR 78 4428092007 SELECTOR BRACKET E1 47 4730253013 2.6x6 CBRTS E1 47 4730253013 2.6x6 CBRTS E1	31	4730355018	3×10 CBRTS	DP-35F	ļ	64	2033642103	OUTPUT CORD ASS'Y	
33	ł	4730305013	3x10 CBRTS (1)	DP-45F		1	2031640000	OUTPUT CORD ASS'Y	EU only
3918423006 MAGNETIC HEAD MAGNETIC HEAD 3918425004 MAGNETIC HEAD ASS'Y DP-45F 68 4730356017 3x12 CBRTS (2) SIZE DET. P.C.B. S	32	4418846014	WASHER			65	4338243001	SUB SHUTTER	
3918425004 MAGNETIC HEAD ASS'Y DP-45F 68 4730356017 3x12 CBRTS (2) 69 4318086000 FRICTION SHEET FRAME 1468150504 FRAME 1468150517 FRAME 1468150517 FRAME 1468150517 FRAME 1468150517 FRAME 1468150507 38 4732309017 3x16 CFTS (1) 39 4218217209 FEC. TURNTABLE 4218358003 FEC. TURNTABLE DP-35F 4218361003 REC. TURNTABLE THORSON BUBBER SHEET A730356033 THORSON BUBBER SHEET A730356033 THORSON BUBBER SHEET A730356033 THORSON BUBBER SHEET A73036033 THORSON BUBBER SHEET A740306033 THORSON BUBBER SHEET A740306033 THORSON BUBBE	33	4418814509	HEAD SUPPORT			66	4730460013		
ASS'Y 35 470009019 3x6 CPS. W 36 KU-50206 P.C.B. SUPPORT 37 1468150504 FRAME E2,EA,EU,	34	3918423006	MAGNETIC HEAD	DP-35F			4733811009	3x25 CBRTS (2)	DP-45F
35 4700009019 3x6 CPS. W		3918425004	MAGNETIC HEAD			67	KU-5020*4	SIZE DET. P.C.B.	
36 KU-50206 P.C.B. SUPPORT E2,EA,EU, EC, EK, EG 1468150504 FRAME 1468150507 FRAME 1468150517 FRAME 1468150517 FRAME 14732309017 3×16 CFTS (1) 38 4732309017 3×16 CFTS (1) 39 4218217209 REC. TURNTABLE DP-35F 4218361003 RUBBER SHEET DP-45F 4218361003 3×12 CRTS (2) 40 4218288005 RUBBER SHEET DP-45F 4733810000 2.6×12 CBTS (1) 41 4730356033 3×12 CRTS (2) DP-35F 4733810000 2.6×12 CBTS (1) 42 1058091303 BOTTOM COVER 4730253013 C6×6 CBRTS 43 4751106042 WASHER 1048079102 INSULATOR ASS'Y 70 KU-5020*5 SIZE DET. P.C.B ARM REST ASS'Y 4418314009 BUSH PLATE 173 4498066209 LED STAND LED WITH WIRE 18498092000 LED WITH WIRE 18498092000 SELECTOR E1 18498092000 SELECTOR BRACKET E1 18498092007 SELECTOR			ASS'Y	DP-45F		68	4730356017	3x12 CBRTS (2)	
37 1468150504 FRAME E2,EA,EU, EC, EK, EG 1468150517 FRAME E1, 73 4498066209 LED STAND 38 4732309017 3x16 CFTS (1) 74 3939220000 LED WITH WIRE 39 4218217209 REC. TURNTABLE DP-35F DP-45F 4218361003 RUBBER SHEET DP-45F 4218361003 RUBBER SHEET DP-35F DP-35F A218361003 3x12 CRTS (2) DP-35F DP-35F DP-35F A733810000 2.6x12 CRTS (1) DP-45F DP-45F DP-45F DP-45F A733810000 2.6x12 CRTS (1) DP-45F DP-45F DP-45F DP-45F DP-45F DP-45F A733810000 2.6x12 CRTS (1) DP-45F DP	35	4700009019	3x6 CPS. W			69	4318086000	FRICTION SHEET	
EC, EK, EG 1468150517 FRAME 38 4732309017 3x16 CFTS (1) 39 4218217209 REC. TURNTABLE 40 4218288005 RUBBER SHEET 4218361003 RUBBER SHEET 4218361003 RUBBER SHEET 4730356033 3x12 CRTS (2) 4733810000 2.6x12 CBRTS (1) 40 1058091303 BOTTOM COVER 41 1048079102 INSULATOR ASS'Y EC, EK, EG 72 4418314009 8USH PLATE 14498066209 LED WITH WIRE 155 1468153103 LED COVER 376 4733812008 3x12 CBTS (1) 77 2123315023 VOLTAGE SELECTOR 78 4428092007 SELECTOR BRACKET 79 4730204017 2.6x8 CRTS (1) 80 4730253013 2.6x6 CBRTS E1 1048079102 INSULATOR ASS'Y	36	KU-50206	P.C.B. SUPPORT			70	KU-5020*5	SIZE DET. P.C.B	
1468150517 FRAME 38 4732309017 3×16 CFTS (1) 39 4218217209 REC. TURNTABLE 40 4218288005 RUBBER SHEET 4218361003 RUBBER SHEET 41 4730356033 3×12 CRTS (2) 4733810000 2.6×12 CBRTS (1) 42 1058091303 BOTTOM COVER 43 4751106042 WASHER 44 1048079102 INSULATOR ASS'Y P-35F 473 4498066209 LED STAND 74 3939220000 LED WITH WIRE 75 1468153103 LED COVER 76 4733812008 3×12 CBTS (1) 77 2123315023 VOLTAGE SELECTOR 78 4428092007 SELECTOR BRACKET 79 4730204017 2.6×8 CRTS (1) 80 4730253013 2.6×6 CBRTS 10 4430253013 2.6×6 CBRTS 10 44480979102 INSULATOR ASS'Y	37	1468150504	FRAME	1		71	3158911103	ARM REST ASS'Y	
38						72	4418314009	BUSH PLATE	
39		146815051		E1,		73	4498066209	LED STAND	
4218358003 REC. TURNTABLE DP-45F 40 4218288005 RUBBER SHEET DP-35F 4218361003 RUBBER SHEET DP-45F 41 4730356033 3×12 CRTS (2) DP-35F 4733810000 2.6×12 CBRTS (1) DP-45F 42 1058091303 BOTTOM COVER 43 4751106042 WASHER 44 1048079102 INSULATOR ASS'Y	38	473230901	7 3×16 CFTS (1)			74	3939220000	LED WITH WIRE	
40 4218288005 RUBBER SHEET DP-35F DP-45F A218361003 RUBBER SHEET DP-45F DP-45F DP-35F DP-35F DP-35F DP-35F A730356033 3x12 CRTS (2) DP-35F DP-45F DP-45F A733810000 2.6x12 CBRTS (1) DP-45F DP-45F BOTTOM COVER A751106042 WASHER INSULATOR ASS'Y	39	4218217209)	DP-35F		75	1468153103	LED COVER	
40 4218263060		421835800	REC. TURNTABLE	DP-45F		76	4733812008	3x12 CBTS (1)	
41 4730356033 3x12 CRTS (2) DP-35F 79 4730204017 2.6x8 CRTS (1) E1 4733810000 2.6x12 CBRTS (1) DP-45F 80 4730253013 2.6x6 CBRTS E1 42 1048079102 INSULATOR ASS'Y	40	421828800	RUBBER SHEET	DP-35F	1	77	2123315023	VOLTAGE SELECTOR	E1 .
4733810000 2.6×12 CBRTS (1) DP-45F 80 4730253013 2.6×6 CBRTS E1 42 1058091303 BOTTOM COVER 43 4751106042 WASHER 44 1048079102 INSULATOR ASS'Y		421836100	RUBBER SHEET	DP-45F		78	4428092007	SELECTOR BRACKET	E1
4733810000 2.6x12 CBRTS (1) DP-45F 80 4730253013 2.6x6 CBRTS E1 42 1058091303 BOTTOM COVER 43 4751106042 WASHER 44 1048079102 INSULATOR ASS'Y	41			DP-35F		79	4730204017	2.6x8 CRTS (1)	E1
42		473381000		DP-45F		80	4730253013	2.6x6 CBRTS	E1
44 1048079102 INSULATOR ASS'Y	42	1058091303	BOTTOM COVER					1	
	43	4751106042	1						•
-8-	44	1048079103	2 INSULATOR ASS'Y	<u> </u>	_ لـ				

PARTS LIST OF P.W. BOARD

KU-5020 SERVO CONTROL UNIT (DP-45F)

Ref. No.	Part No.	Part Name	Remarks				
SEMICONDU	CTOR GROUP						
IC1							
1C1 1C2	2630174003	IR3T03					
IC4	2630237005	LA6358					
	2630257001	M5218P					
IC3,5	2630198005	NJM4556					
1C6	2630147001	μPC78M05H					
IC12	2630147001	μPC7905H					
IC13	2620276005	HD14066BP					
IC7		HD7403P	į				
IC9, 10	2620218005	HD7473P					
IC11	2620057004	2SA1015 (Y)					
TR1,2	2710102005	25/A1015 (1)					
8, 18, 19							
23, 24	0700400000	200 181E (V)					
TR4~7	2730198002	2SC 1815 (Y)					
9 ~ 17		000407 (0)					
TR3	2740038002	2SD467 (C)	·				
D7 ~ 10	2760237001	RV06					
D1 ~ 6	2760049008	IS2076					
11 ~ 38		TUEDANOTED (4KO)					
TH1	2760311008	THERMISTER (1KΩ)	555				
LED6, 9, 10	3939041001	LED (LN81RCP-HL)	RED				
LED3 ~ 5	3939213004	LED (GL-5EG23)	GREEN				
TP1,2	3939157005	TPS605					
LED1	3939185006	LED (NL0202GP3)					
CD1, 2	3939053002	CDS					
CD3	3939053028	CDS					
RESISTOR G	ROUP						
			Metal film				
R20	2452195008	RN14K2E332G	3.3KΩ ¼W				
R19	2452201002	RN14K2E562G	5.6KΩ ¼W				
R12	2452215001	RN14K2E223G	22KΩ ¼W				
R11	2452223006	RN14K2E473G	47KΩ 1/4W				
1			Volume				
VR1	EP-5462H15	SOLID VOLUME	22ΚΩ				
VR3 ~ 5	2116000073	VO8PB203	20ΚΩ				
VR6, 7	2118024015		5ΚΩ				
	<u> </u>						
CAPACITOR	I GROOF						
			Ceramic				
C39, 40	2531004007	CK45B1H102K	1000PF 50V				
70,73		•					
77, 78							
84 ~ 86							
C14	2531008003		4700PF 50V				
C57	2531024003	i	0.01μF 50V				
C25, 26, 29	2531027000	CK45F1H104Z	0.1μF 50V				
30, 33, 34							
37, 41, 56							
58, 61, 62							
79							
C7,8	2533619005	1	47PF 50V				
C46	2533627000	1	100PF 50V				
C1, 2, 11	2533637003	CC45SL1H271J	270PF 50V				
13, 65		·					
C21, 22	2544129005	CE04W1A470=	47μF 10V				
C6, 23	2544132005	CE04W1C100=	10μF 16V				
28, 31, 32							
38, 45, 47							
1							

	*	*	
Ref. No.	Part No.	Part Name	Remark
48, 51, 53			
87			
]		Electrolytic.
C63,69	2544135002	CE04W1C470=	47μF 16V
80		,	'
C9, 24, 27	2544136001	CE4W1C101=	100μF 16V
50, 68		*	د
C3, 10	2544146004	CE4W1H010=	1μF 50V
12, 17, 18			
20, 66, 67			
55			
C35,36	2544086009	CE04W1E222=	2200µF 25V
C64	2544019005	CE04W1C221=	220μF 16V
			Film
C19	2551070008	CQ93M1H682K	0.0068µF
			50∨
C4, 5, 49	2551072006	CQ93M1H103K	0.01μF 50V
C52	2551075003	CQ93M1H183K	0.018µF 50V
C16, 44	2551122008	CQ93M1H473J	0.047μF 50V
C60	2551078000	CQ93M1H333K	0.033µF 50V
C15	2554194017	CQ93P1H473J	0.047μF 50V
OTHER PAR	TS GROUP		
	4178028101	HEAT SINK	
	4428030108	VOLUME BRACKET	
	3998025000	CRYSTAL (4.5MHZ)	
	2129180003	PUSH SWITCH	•
	2129218001	PUSH SWITCH	* -
	4438568107	LED HOLDER	,
	2050158049	4P WRAPPING	
		TERMINAL	· .
	2050158036	3P WRAPPING	
		TERMINAL	

[•] The carbon resistors rated at 1/4W are not listed herein.

KU-5021 SERVO CONTROL UNIT (DP-35F)

			T	Title		
Ref.	No.	Part No.	Part Name	Remarks		
SEMI	SEMICONDUCTOR GROUP					
IC7	IC7 2620276005		HD14066BP			
IC8, 1	IC8,11 2620057004		HD7473P			
IC1	IC1 26301 73 004		IR3T02			
IC2	IC2 2630174003		IR3T03			
IC4		2630237005	LA6358			
IC3, 5	5	2630257001	M5218P			
IC6		2630198005	NJM4556			
IC12		2630147001 2630160004	μPC78M05H			
	2, 22	2710102005	μPC7905H 2SA1015 (Υ)			
TR4	-	2730198002	2SC1815 (Y)			
	,16,17		2001010 (17			
19 ~						
TR3		2740038002	2SD467 (C)			
D1,4	~6,	2760049008	1S2076			
11 ~	13					
16, 17						
36 ~						
D7 ~	10	2760237001	RV06			
TH1	۰.	2760311008	THERMISTER (1KΩ)			
7,8	3~5	3939213004	LED (GL-5EG23)	GREEN		
LED1		3939185006	LED (LN0202GP3)			
LED6	,9,10	3939041001	LED (LN81RCP (HL))	RED		
CD1		3939053028	CDS (10-15KΩ)	-		
CD2,	3	3939053002	CDS			
RESIS	STOR	GROUP				
				Metal film		
R20		2452195008	RN14K2E332G	3.3KΩ ¼W		
R19		2452201002	RN14K2E562G	5.6KΩ ¼W		
R12		2452215001	RN14K2E223G	22KΩ ¼W		
R11		2452223006	RN14K2E473G	47KΩ ¼W		
				Variable		
				resistor		
VR1	_	EP-5462H15	SOLID VOLUME	22ΚΩ		
VR3 -	ŀ	2116000073 2118024015	V08PB203	20ΚΩ		
			V16V20KB502	5ΚΩ		
CAPA	CITOR	RGROUP				
				Ceramic		
C39, 4	Ю	2531004007	CK45B1H102K	1000PF 50V		
C14 C25,2	200	2531008003 2531027000	CK45B1H472K	4700PF 50V		
30,33,		2531027000	CK45F1H104Z	0.1μF 50V		
37,41	-					
C7, 8		2533619005	CC45SL1H470J	47PF 50V		
C42, 4	6	2533627000	CC45SL1H101J	100PF 50V		
C11,13	- 1	2533637003	CC45SL1H271J	270PF 50V		
1				Electrolytic		
C21, 2	2	2544129005	CE04W1A470=	47µF 10V		
C6,23,	28	2544132005	CE04W1C100=	10µF 16V		
31,32,	38					
45,48,	53					
C63,6	9	2544135002	CE04W1C470=	47µF 16V		
C9, 24		2544136001	CE04W1C101=	100µF 16V		
27, 50		L				

Ref. No.	Part No.	Part Name	Remarks	
C12, 17	2544146004	CE04W1H010=	1μF	50V
18, 20				
66, 67				
71,72				
C47,55	2544147003	CE04W1H2R2=	2.2μF	50V
C36	2542037005	CE02W1E102=	1000μF	25V
C35	2542038004	CE02W1E222=	2200µF	25V
			Film	
C19	2551070008	CQ93M1H682K	0.0068μ	F
				50V
C4,5	2551072006	CQ93M1H103K	0.01µF	50V
49, 54				
C52	2551075003	CQ93M1H183K	0.018µF	50V
C60	2551078000	CQ93M1H333K	0.033µF	50V
C16, 44	2551122008	CQ93M1H473J	0.047µF	50V
C15	2554194017	CQ93P1H473J	0.047µF	50V
OTHER PA	RTS GROUP			
	4178028101	HEAT SINK		
	4428030001	VOLUME BRACKET		
	3998025000	CRYSTAL (4.5 MHZ)		
SW9	2129180003	PUSH SWITCH		
SW1 ~ 6	2129218001	PUSH SWITCH		
	4438568107	LED HOLDER		

^{*} The carbon resistors rated at ¼W are not listed herein.

KU-5010/5014 MOTOR DRIVE UNIT

Ref. No.	Part No.	Part Name	Remarks				
SEMICOND	SEMICONDUCTOR GROUP						
IC201	2630257001	M5218P					
H201, 202	2680042004	H-300A	ORG, PINK				
TR202,204	2710105002	2SA966 (Y)					
TR201, 203	2730201009	2SC2236 (Y)					
D201, 203	2760049008	1S2076					
TH201,202	2760311008	THERMISTOR $(1 K\Omega)$	*)				
RESISTOR	RESISTOR GROUP						
VR203,204	2116000031	V08PB 102 (1KΩ)					
VR201,202	2116000073	V08PB203 (20KΩ)					
205, 206							
CAPACITÓR GROUP							
C205	2531027000	CK45F1H104Z	0.1μF 50V				
C202	2544015009	CE04W1C100=	10µF 16V				
C203, 204	2551072006	CQ93M1H103K	0.01μF 50V				

[•] The carbon resistors rated at ¼W are not listed herein.

PACKING AND ACCESSORIES GROUP

Ref. No.	Part No.	Part Name	Remarks
	5038044101	PACKING ASS'Y	
	5038045100	PACKING (L)	
	5038046109	PACKING (R)	
	5298006002	45 ADAPTOR	
	5118243000	INSTRUCTION	
		MANUAL	
1	2033667007	PLUG ADAPTOR	EP, E1
	3158547001	SHELL ACCESSORY ASS'Y	EU, EC
	5018280338	CARTON CASE ASS'Y	DP-35F
	5018280325	CARTON CASE ASS'Y	DP-45F
	5018281133	CARTON CASE	DP-35F
1	5018281120	CARTON CASE	DP-45F
	5028103007	BOTTOM PLATE	
	5028104006	PROTECTION PLATE	·
	5028102105	UPPER PLATE	
	5058006006	ENVELOPE	60×100

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SCHEMATIC DIAGRAM OF DP-35F

